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PUEBLO RUINS NEAR FLAGSTAFF, ARIZONA. A PRELIMINARY NOTICE

By J. WALTER FEWKES

INTRODUCTORY NOTE

In April, 1900, I made a cursory examination of the ruins near Flagstaff, Arizona, with a view to more extended future exploration,¹ finding this neighborhood, which of late has been neglected by archeologists, to be a most interesting field of research. The three types of Arizonian ruins, namely, (1) cavate rooms, (2) cliff-houses, and (3) pueblos, are well represented in this locality. The cavate rooms are burrowed in lava, generally in the tops or sides of cinder-cones; the cliff-houses in Walnut cañon are small but typical; the pueblos occur in well-preserved ruins near Little Colorado river, and are built of lava, sandstone, and limestone blocks. There are many examples of the third type of ruins in the cedars not far from Flagstaff, but it is to those near the Black falls of the stream mentioned that attention will especially be called. The ruins noted in this preliminary account are only a few of many ancient habitations dotting the country about Flagstaff. The paper will deal only with the more striking examples of two of the types mentioned.

I will consider in sequence the cavate rooms and the pueblo ruins, passing, for the present, the cliff-houses of Walnut cañon which have been so frequently described by others. The hitherto undescribed ruins near Black falls, to which especial attention is now given, will, for convenience, be divided into three groups, called *A*, *B*, and *C*.

¹ This work was done under the direction of the Bureau of American Ethnology. It is my intention later to excavate the ruins herein described.

Sitgreaves, in 1852, seems to have been the first writer to refer to the ruins about Flagstaff and along the Little Colorado. He figures one of the ruined pueblos near the cascades or falls,¹ which is of the same general character as those near Black falls, which he probably did not visit. Major Powell, in 1885, visited and later described² the cliff-houses, the cavate rooms of the volcanic cones, and several pueblo ruins north and northeast of Flagstaff. He did not visit the Black Falls ruins, which are undoubtedly similar to some of those which he describes. Since Powell's description the literature of the Flagstaff ruins has been confined mostly to popular newspaper articles, archeologists seeming to have paid little attention to this neighborhood.

CAVATE ROOMS

The cavate rooms near Flagstaff are excavated in the lava, or volcanic breccia, and may be classified as (1) cavate rooms with vertical entrances, and (2) cavate rooms with lateral entrances. The former are well illustrated by the "old caves," nine miles east of Flagstaff; the latter by the "new caves," twelve miles from the same place, in the same direction, and by cavate rooms half a mile west of Turkey Tanks. These two types of cavate rooms are similar, and their former inhabitants were apparently of the same culture.³ Major Powell learned from the Indians of Cataract cañon that the ancestors of the Havasupai occupied these cavate houses, and he states that "they doubtless lived on the north, east, and south of San Francisco mountain at the time this country was discovered by the Spaniards, and they subsequently left their cliff and cavate dwellings and moved into Cataract cañon, where they now live."

The fragments of pottery seen about the entrances to these

¹ Probably the "cascades" were the Grand falls, miles above the Black falls.

² See *Seventh Annual Report of the Bureau of Ethnology*, 1891.

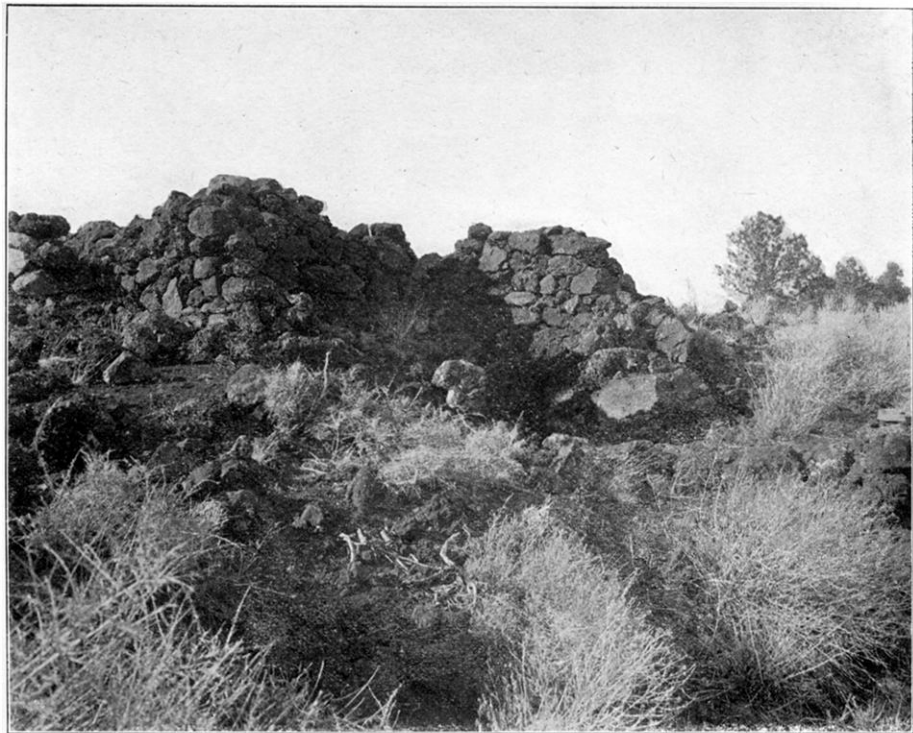
³ The relationship of the inhabitants of the cavate rooms to modern survivors will be discussed in a final report. Both the new and the old caves, by reason of their proximity to Flagstaff, are often visited by tourists.

caves are identical with those found near the pueblo ruins in the neighborhood, and there is no doubt that the cave inhabitants had burrowed in the lava as the most practical means of constructing habitations in this neighborhood. Free walls are found in combination with the caves, but these walls, save that they are built of lava, have no distinctive characteristics. This would indicate that the builders simply utilized readily available building material and took advantage of peculiar geological conditions.

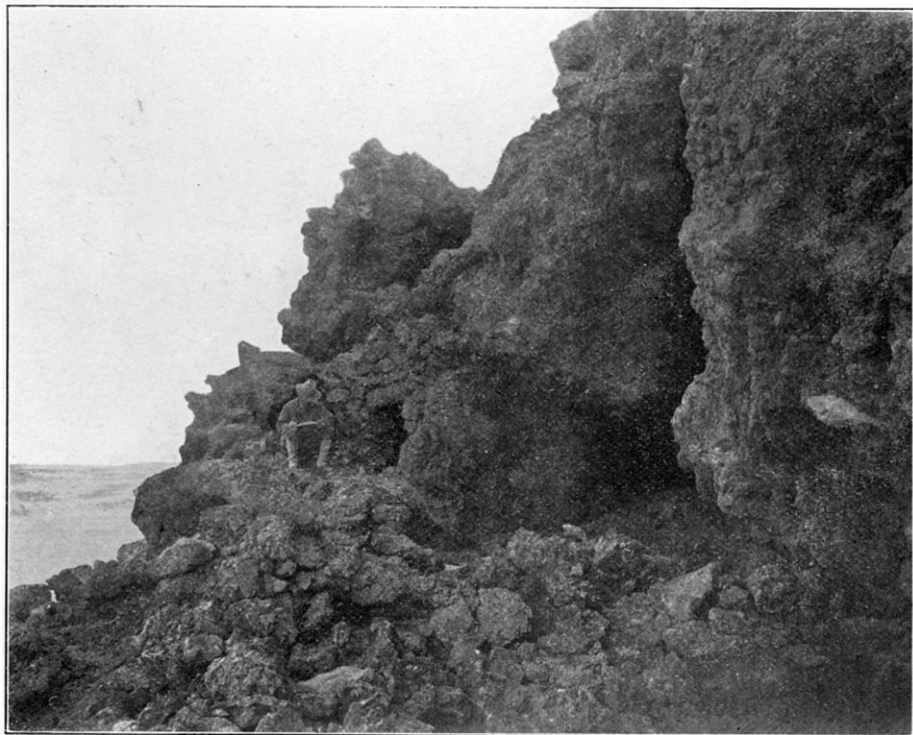
OLD CAVES

The "old caves" lie near the top of Old Cave mountain, about nine miles north of east of Flagstaff, and cover an area of about five acres. On the top of this height there is a level space which was surrounded by a rough wall made of volcanic breccia, from which a good view can be had of the surrounding country. The caves are found on the southern slope, and were excavated in a conglomerate of cinders or volcanic breccia which bears every evidence of having been erupted from a crater or blowhole (plate XVI, *a*). Clambering over the rough lava blocks one finds everywhere on the surface the remains of walls, often continuous, indicating former rooms. In places there are level spaces which seem to have been plazas, and the entrances to the caves often open vertically from these levels into the subterranean rooms. At other points it would seem as if these rectangular rows of walls were continuous, but there is no visible evidence that they had roofs, which, however, may have existed in former times. In fact, the old caves show combinations of underground cavate rooms with free walls above, and when inhabited the settlement must have looked like a collection of low, one-story rooms continuous for several hundred feet. We may therefore call this cluster of cavate rooms a pueblo in which each room above ground has a corresponding subterranean chamber hewn out of volcanic breccia.

One of the best-preserved and characteristic rooms of the old caves, with a vertical entrance, is shown in the accompanying



a—Type of the “Old Caves”



b—Type of the “New Caves”

plan (figure 55). It will be seen that there are two subterranean rooms, *a* and *b*, each of which is entered by an opening in the roof, indicated by a dotted line. Room *a* measures 12 feet each way, and the entrance measures about 6 feet. This entrance has a square enlargement, or chimney, on one side, which extends to the floor of room *a* and has perpendicular, regular walls.

At one corner of room *a* there has been hewn out of the lava a small recess (*e*), the floor of which is lower than that of the room. There is also a small recess (*f*) at one side of the chimney.

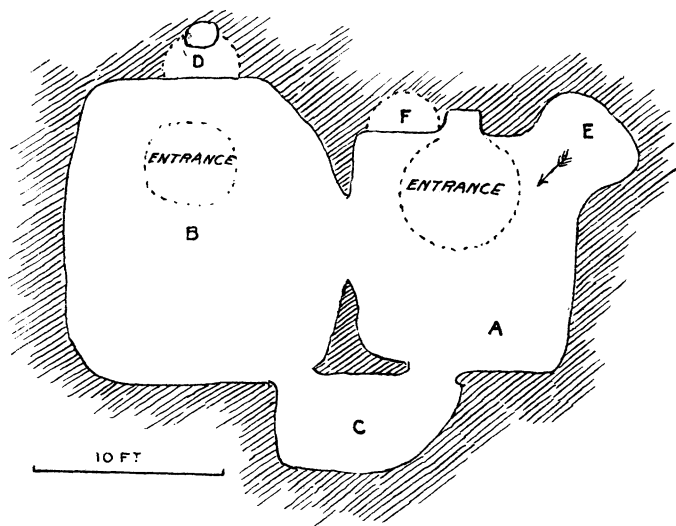


FIG. 55—Plan of an "old cave" dwelling.

Room *b* is larger than room *a*, being about 16 feet square. It communicates with the latter by an opening or broken doorway, and has an opening through the roof. The floor is somewhat lower than that of *a*. A recess (*d*) on one side of this room also communicates with the outside by a small opening which bears the same relation to room *b* that the flue (*f*) does to room *a*.

Room *c* is an oblong, irregular, subterranean chamber, 5 by 7 feet, with passageways into rooms *a* and *b*. The opening into *a* is almost perfectly square, that into *b* less regular. Its floor is several feet lower than the floors of the other two large rooms in

this cluster. There are evidences of clay plastering in several places, and apparently the floor, walls, passageways, and possibly the roof, were smoothly finished. This plastering, however, has fallen, exposing the rough lava corners.

NEW CAVES

The mountain in which the new caves occur is about three miles west of Turkey Tanks, or about 12 miles east of Flagstaff. This height is interesting from a geological point of view, it being a section of the rim of an old crater, as may be seen from its summit. The remaining portion of the crater rim, or that on the eastern side, has been eroded into hills, the relations of which to the crater are recognized only by their positions. The highest part of the rim, and that in which the caves are found, is the western wall of the crater, which, with an adjacent southern section, forms a crescent connected by a ridge of less altitude. The more northerly of these elevations is the higher, and the cavate rooms occur on its eastern side.

Climbing the mountain from the west, the ascent, though steep, is not difficult, the trail passing stunted cedars over a mass of cinders. In the depression between the two hills which form the crescent, we find rows of volcanic breccia arranged in rectangular and other forms suggesting a reservoir. From this point the ascent becomes more difficult, and as one reaches the top of the higher hill he finds himself on the rim of a former crater. On the east the rim rises almost perpendicularly, and its walls on that side are outcroppings of exceedingly rough cinder conglomerate. In this almost perpendicular wall, facing what may have been the middle of the former crater, tier upon tier of cavate rooms, irregularly arranged and most difficult of approach, have been excavated. The crest of this as well as that of the adjacent lower section of the crater rim is capped by artificial walls of considerable height, indicating former houses. The whole aspect of the place is one of desolation, and the lava appears as if it had been molten but a

few generations ago. It may have been great stress of danger which drove the aborigines to seek homes in this forbidding locality.

TURKEY TANK CAVES

About half a mile west of Turkey Tanks, or about fifteen miles east of Flagstaff, there is a collection of cavate rooms with lateral entrances arranged in tiers. These caves, although not so numerous as the new caves, are comparatively well preserved. They are situated a short distance to the left of the road from Flagstaff, on the uplifted outcrop of what appears to be an old volcanic blowhole, and are confined to the northern side of the depression which marks the former place of eruption (plate XVI, *b*).

The outcrop on this side of the depression is composed of alternate layers of hard lava and volcanic breccia. The former would tend to resist any working with primitive implements, but the latter could readily be excavated with stone tools. The average thickness of the layers is about eight feet. By the excavation of the breccia the layer of harder lava above it has been undermined, and at present has fallen in places, filling the rooms or closing their entrances so that the form and dimensions are no longer determinable. As the layers are uplifted, vertical entrances into these cavate chambers are absent, the doorways entering horizontally from the side of the cliff. There are at least three tiers of these rooms, corresponding with the volcanic strata.

In the construction of some of these cavate rooms there is a combination of stone walls and excavated chambers, the lateral separation of the rooms having been made by a plastered wall of small boulders brought from the bottom of the adjacent depression. Apparently, also, walls formerly existed in front of the entrances to the caves, but these for the greater part have fallen, and their outlines are difficult to trace except in small sections.

Entering by a side opening, we pass into a subterranean room, 12 by 10 feet, and 6 feet high, the walls and floor of which are

partially plastered. This room has five smaller rooms leading from it, which we will call *b*, *c*, *d*, *e*, and *f*. They average about five feet in diameter, and have their floors depressed about a foot below that of the main room, *a*. The entrances into these lateral rooms, especially that into *d*, are carefully made, are almost square, and when plastered, as there is good evidence that they once were, made good doorways. In fact, although the walls of most of these cavate chambers are now very rough, and the rooms seemingly desolate as places of habitation, they must once have been comfortable abodes, for the plastering made the finish almost as smooth as that of any wall which could be constructed.

Several of the rooms in which the plastering still remains have ledges and cubby-holes in which household utensils were doubtless kept. The similarity of these cavate chambers to those excavated in volcanic tufa in Verde valley is apparent. The material in which they occur is different, but the plan of the rooms is almost identical. Whatever peoples inhabited the cavate dwellings of the cinder-cones near Flagstaff and the tufa mesas of the Verde, their culture was not radically different.

RUINS NEAR BLACK FALLS OF THE LITTLE COLORADO

THE ENVIRONMENT

It has long been known that the banks of the Little Colorado and the neighboring mesas were sites of ancient dwellings, but exploration has been confined mostly to the upper part of the river and its tributaries. The numerous ruins along the stream from Grand falls to its confluence with Rio Colorado have been wholly neglected, but there is little doubt that future excavation will be rewarded with many novelties.

The Black Falls ruins have been known for several years to local amateur archeologists, and a considerable collection of ancient objects has been taken from them by Mr Benjamin Doney, of Flagstaff. Under his guidance several well-known residents of

that town, among whom may be mentioned Dr Robinson and Mr Jack, have visited and photographed them.¹ Herders and cowboys are acquainted with the ruins, and the former have cleared some of the rooms for use in winter.

The geological features of the region in which these three groups of ruins occur are instructive, but for present purposes one or two simple statements will suffice. The three well-marked formations — lava, sandstone, and limestone — have affected the appearance of the ruins. The black lava covers the red sandstone and limestone, forming great mesas or isolated buttes, the summits of which are crowned with ruins. The lava ruins have low, rough walls in which adobe mortar was not detected. The red sandstone formed a more tractable material, and the buildings constructed of it show fine masonry with adobe mortar. These ruins ordinarily stand on the brink of small cañons eroded in the sandstone, on isolated blocks of the same stone, or on ridges left by erosion. If these lava and red sandstone ruins were found in different localities they might be regarded as products of different peoples, but their existence side by side in this region shows that the slight differences in their architecture were due simply to the building materials employed. The irregular forms of the lava blocks made it impossible to construct from them the fine rectilinear walls which were possible with the well-squared blocks of sandstone and limestone. The erosion of the lava produces a coal-black, porous sand which as a rule covers the finer red soil derived from the sandstone and limestone. This soil, drifting into pockets or depressions in the surface rocks, afforded burial places for the inhabitants of the villages.

This region has few trees ; there are no pines, and only a few cedars. It is the same sagebrush country which we find near the upper Little Colorado at Holbrook and Winslow.

¹ The author was guided to these ruins by Mr Doney. He is indebted to Dr Robinson and Mr Reed for kodak photographs, and to Mr Jack for measurements of several rooms.

The region is arid ; it has now few springs, and those which were used in ancient times have probably been filled with drifting sand.¹ Volcanic agencies have left their mark on the whole region, causing in places deep fissures in the rocks into some of which a strong current of air continually passes, and from one of which emerges a roar as if from subterranean currents of water. One of the largest of these fissures is about two miles from the Tuba road, on the way to the ruins called cluster *A* ; others are found in the rocks near *G* and *H* of this cluster, where their depth has not been determined. These crevasses, which are no unusual feature in the geology of this region, vary in breadth from a few inches to many hundred feet, and from a hundred yards to miles in length. When very broad they form cañons, which end abruptly or merge into "washes" as the configuration of the country may dictate.

GENERAL FEATURES

The ruins near Black falls are, as a rule, cubical in form, with rectangular rooms of one or more stories. Curved walls are rare, although in some instances the shape of the ruin follows the curvature of the mesa on which it stands. These ruins are built of both sandstone and lava, and the two varieties are found in close proximity, or within a few hundred feet of one another.

The sites of these ruins are ordinarily elevated, and it is not uncommon to find an entire mesa top either covered with rooms or surrounded by a wall perpendicular with the escarpment. The ground-floor rooms had no lateral external entrances, but where there were several chambers side by side they communicated with each other by doorways. In the case of two- or three-story houses

¹ I do not share a common belief that when these now-ruined structures were inhabited the precipitation was greater. In an arid region springs rapidly fill with drifting sand if not dug out repeatedly. The Hopi are obliged to clean out some of their largest springs annually.

it is probable that the ground floor was used for storage and was entered from the roof.

This is an architectural feature still retained in the old Hopi houses, but it has been somewhat masked by more modern buildings erected in front of them. The old houses of Walpi, Sichumovi, and Hano had ground floors which were entered from the roofs, to which one mounted by ladders, while entrance to the second story was gained by means of a side doorway from the roof of the first. Many of these old rooms are still to be seen at Walpi, especially around the plaza, and there are one or two examples in the villages of Sichumovi and Hano.¹ The oldest houses of Tusayan never had lateral entrances from the ground floor, but when the first story was occupied it was provided with a hatchway in the roof. This type of room, however, is rapidly disappearing, the majority of ground-floor rooms on the East Mesa now being provided with doorways in the walls; on the Middle Mesa and at Oraibi the number of ground-floor rooms entered by a side door is still smaller than on the East Mesa. It may safely be laid down as a rule that, whenever in the Hopi pueblos one finds rooms on the ground floor entered by lateral doors, the construction is new.²

The character of the sandstone and limestone of the Flagstaff region is such that, when the stone is fractured, slabs are produced which make possible the construction of excellent walls. Blocks of lava, however, have no flat faces, and when used as building material result in poor masonry, for the adobe mortar

¹ A good example of the ancient houses of Walpi, in which the lower story serves as a dwelling-room at certain times, is Saliko's home, near the Snake rock, and the row of rooms from Honsi's house to the *Moñkiva*. The Flute house is also a fine example of this type. In Sichumovi the home of Pütche illustrates this ancient type, and there are several in Hano, of which Kalacai's house is a good example.

² I shall consider this architectural likeness of the ground rooms of ancient ruins to old Hopi houses in my final article on the Black Falls ruins, where plans will be given illustrating the relation of the ground rooms with lateral doors to the old rooms on the East Mesa. The ruins near Black falls have their ground-floor rooms like the old rooms of the Hopi pueblos.

readily washes from the joints and the walls soon fall. It is rare to find houses built of the latter material which now stand many stories high. The best rooms constructed of lava contain also sandstone slabs, which have strengthened their walls, as in the "citadel" of the Black Falls ruins, where blocks of sandstone were also used as lintels. None of the walls show evidence that the building stones were dressed after being quarried.

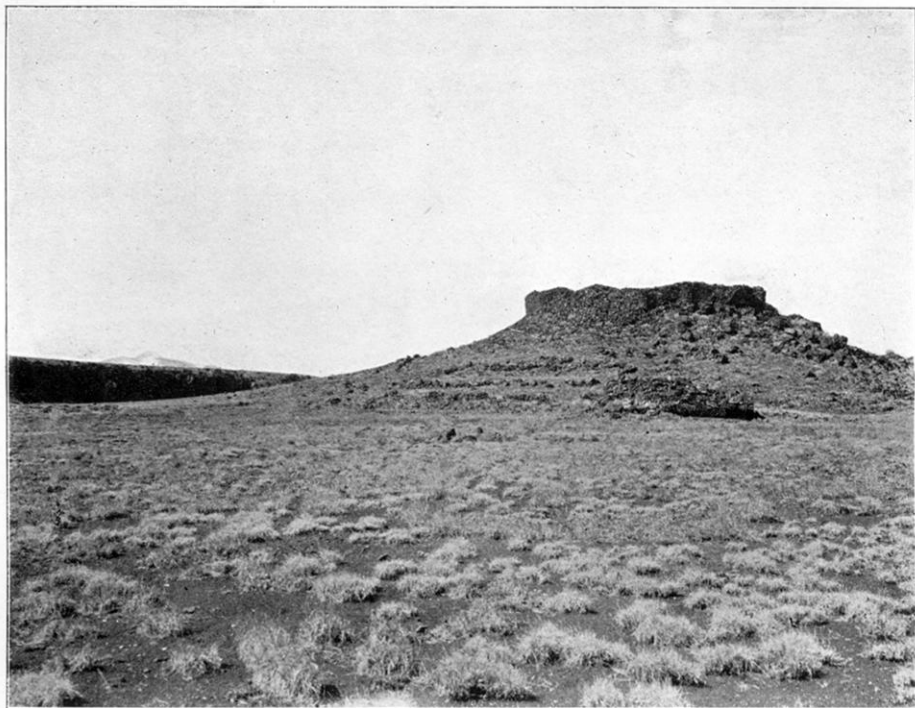
The highest walls of these pueblos as a rule were situated on the northern and western sides, the pueblos being terraced on the south and east. This arrangement was apparently adopted to secure sunny exposure.

In many of the ruins there are found, at the base of the mesa, on the southern and eastern sides, rooms of a single story which, from their position, we may designate basal rooms. They are now covered with *débris*, but were once protected by the overhanging edge of the mesa, suggesting cliff-houses, of which they may be a survival. These basal structures may have been used as granaries, but in none of them were remains of roofs found.

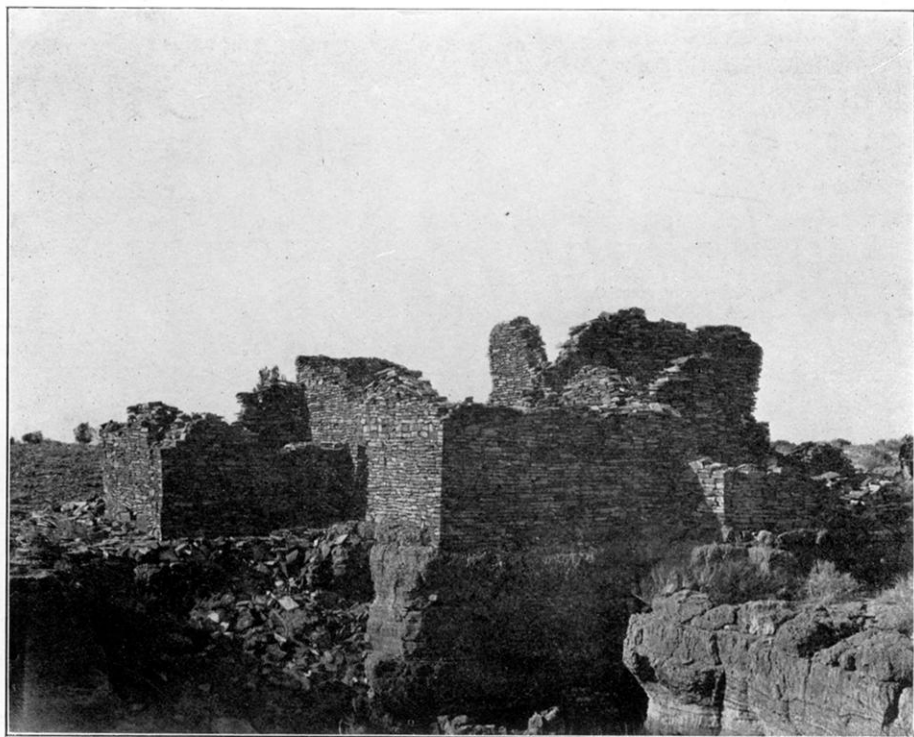
With the exception of group *B*, ruin A, most of the ruins show little evidence of long occupancy; few logs or beams remain in them, there are no extensive deposits of *débris*, and there is a lack of large quantities of pottery fragments such as are usually found about pueblos which have been occupied for many generations. The general indication is that these buildings were inhabited in comparatively modern times.

None of the rooms show marks of surface plastering, except those of group *B*, where it is confined to the interior of the walls, as is the case with the older Hopi buildings.

The size of the rooms is much greater than is ordinarily the case with very ancient ruins. No kivas were found, and it is believed that the religious ceremonies were held in the ordinary domiciles. No building had a roof intact, but in many instances the remains of the roofs and floors of the upper rooms were found in the chambers below.



a—Group A, The Citadel



b—Group A, Ruin J

RUINS NEAR BLACK FALLS OF THE LITTLE COLORADO

The fact that wooden beams occur so abundantly in group *B*, ruin *A*, implies that it was either the last house to be abandoned in this neighborhood or that the beams were taken from the others to this pueblo, and when it was deserted its inhabitants moved too far away to carry heavy objects with them. Some of the timbers in the modern Hopi houses are said to have been dragged from the Little Colorado, possibly from old ruins.

GROUP *A*

Group *A* includes a cluster of ruins which, as a rule, are small, and bear general similarity in construction. It is situated about fifteen miles west of Little Colorado river. Following the road from Flagstaff to Tuba to within about eleven miles of Tanner's crossing, after passing Deadman's flat, the visitor turns to the right, and, proceeding four miles eastward, finds himself in the midst of the group. There are no trails or wagon-tracks from the well-traveled Tuba road to group *A*; but the country is so level that one can readily go overland to almost any point. A castellated, truncated lava cone, the "citadel" of the group (plate XVII, *a*), can be seen soon after one leaves the Tuba road, and this prominent landmark gives the general direction of the ruins among which it is situated. From the top of this citadel all the ruins of group *A*, with one or two exceptions, are visible, and the visitor is advised to inspect it first in order to determine the position of the surrounding ruins.

THE CITADEL

The walls of the citadel are constructed of blocks of lava and sandstone, and cover the top of a truncated elevation. They are arranged about a level central court or plaza, the surrounding walls of which are best preserved on the western side. The hill upon which the citadel is built bears evidence of having once been a volcanic cone, and was a most advantageous place of refuge for the inhabitants of the neighboring houses, as it had a

commanding position, was difficult of access, and was well fortified. As some of the structures were of two stories, they appear to have been permanently inhabited.

Twenty-three small ruins were counted from this elevated position. For convenience of description these may be designated A, B, C, etc.

GROUP A, RUIN A

Ruin A of group A is situated at the base of the truncated mesa of the citadel; it is built of red sandstone, with a few courses of lava blocks, is 50 feet long by 12 feet wide, and contains five rooms arranged side by side. Although the house was evidently never more than one story high, the many fallen building-stones would seem to indicate that its walls were once considerably higher than at present. Few floor-beams or rafters were detected.

Near this ruin, at the base of the hill, are four walled inclosures, one above another, suggesting terraced gardens. Their low walls are composed of alternate rows of lava and sandstone. Near these former gardens is a depression which might once have been a reservoir. This ruin is the only one visited which was not built on an elevated mesa at or near the edge of a cañon.

GROUP A, RUINS B, C, AND D

There are remains of three houses, built of lava and sandstone blocks, on a small lava hill a few hundred feet north of the citadel. On the same elevation there is a circular wall which may have served as a fortification. Most of the walls have fallen, and it is almost impossible to determine the relationship of the former rooms. There are also some small ruins on a lava hill near the elevation on which B, C, and D are situated.

GROUP A, RUINS E AND F

A considerable distance from the last-mentioned cluster, but in the same direction from the citadel, there are situated two

conspicuous ruins visible from a considerable distance. One of these, on the top of a lava mesa, is built of the same material of which the mesa is composed; the other, situated at its base, is constructed of red sandstone. Near the latter, on a lava mesa, there are many pictographs, representing spirals, frogs, snakes, and unknown figures. There is much broken pottery near ruin F.

GROUP A, RUINS G, H, I, AND J

These ruins, especially G, H, and J, are among the best preserved of all those in group A. Ruins G, H, and J are constructed of limestone, and are situated on the brink of a cañon, at the bottom of which, near the first mentioned, are mounds indicating the site of I. The walls of G, H, and J are well preserved and show some of the best aboriginal masonry in Arizona.

Ruin G had two rooms with walls rising twenty feet from the rim of the cañon. The lower courses of the walls are much larger than the upper, as is true of others in this neighborhood. The level of the floors is indicated by courses of larger stones.

Ruin J (plate XVII, *b*) is the best preserved of all the ruins in group A, and presents exceptional features. It is situated on the left wall of a cañon, about forty feet deep and of the same width, which deepens and widens east of the ruin, and then narrows, forming a natural corral enclosed by cliffs. Eight good rooms were noted in that part of the ruin situated on the top of the cañon wall, and in the cañon below it there were several semicircular basal rooms, some of which were sheltered by an overhanging cliff. Similarly sheltered rooms are represented in many of the ruins in this neighborhood, but nowhere else are they so well preserved. There are no beams in place, but their former positions are shown in many walls by openings, indicating that when inhabited the pueblo had two, possibly three, stories. An inclosure which may have been a ninth room is so filled with fallen walls that details of its construction or size could not be determined.

As none of the rooms have external lateral openings on a level with the foundations, it is naturally supposed that the rooms were entered by means of ladders and hatchways. There are a modern doorway and fireplace in one room, evidently of later construction than the walls of the rooms.

Perhaps the most problematical structures in this ruin are the small cysts in the cañon walls east of the entrance. A thin layer

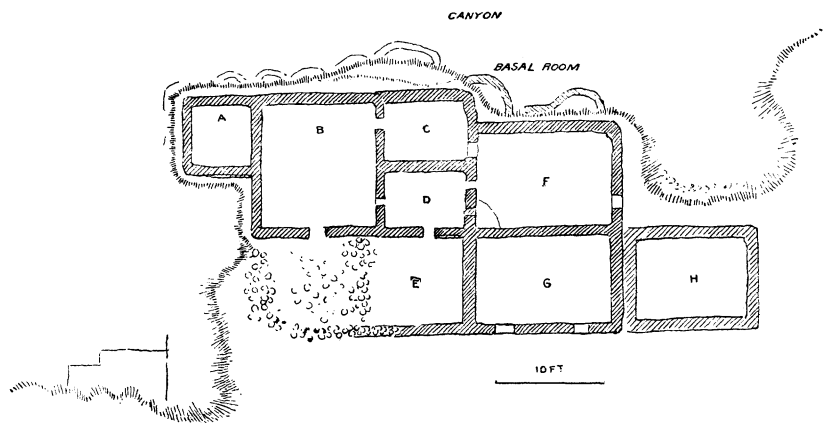


FIG. 56—Plan of group A, ruin J.

of softer rock has so weathered as to leave a horizontal crevice which at intervals is divided, by stones set on edge, into receptacles a foot or so deep. They were formerly closed by flat slabs of stone, only two of which now remain in place. These cysts were nicely plastered, and the slabs which closed them were luted in place with adobe. Nothing was found in them to indicate their use, whether as burial places for the dead or as bins for the storage of corn. Their number was considerable, but their size so small that their capacity could scarcely have been more than a few bushels. This is the only ruin in which such inclosures were found, and no theory is advanced as to their former use.

GROUP A, RUIN K

Ruin K, which evidently formerly contained several rooms, is divided into two sections and is situated on a high lava mesa

difficult of approach. The walls of the larger section inclose three well-preserved rooms and still rise to a height of about eight feet. Five feet above the base, the red-sandstone blocks of which the walls are built are replaced by a course of stone of lighter color, which forms a horizontal band around the ruin. The second section consists of a low, rough wall built along the edge of the cliff, inclosing a level space in front of the first section. There are isolated rooms in this inclosure, and a depression which may have been a reservoir. This ruin, like many others, consisted of dwellings and a fort for protection. There are instructive pictographs on the rocks near by.

GROUP A, RUIN L

At the base of the lava mesa on which the last-mentioned ruin stands, there is a ruin of red sandstone with five rooms and a foundation of unusual shape. A huge rock, cubical in form, has fallen a few yards from its former position in the bluff. Ruin L is built on the top of this detached block, and its fairly well preserved walls are separated from the bluff on all sides by a wide crevice. From a distance the ruin appears to be perched on the bluff, but closer observation shows its separation from the latter by an impassable natural moat.

GROUP A, RUIN M

This is an oblong ruin, rising from the side of a deep, narrow cañon, with walls consisting of alternating courses of large and small blocks of red sandstone. Some of the walls have fallen, but sections fully ten feet high still remain in place. There are evidences of five rooms, each two stories high, but most of the chambers are filled with fallen stones. The cemetery of this pueblo lies west of the ruin, where there are also remains of walls.

Small ruins may be seen near the road from group A to B, a few miles to the left. Their walls are in good condition, but no peculiar features were observed.

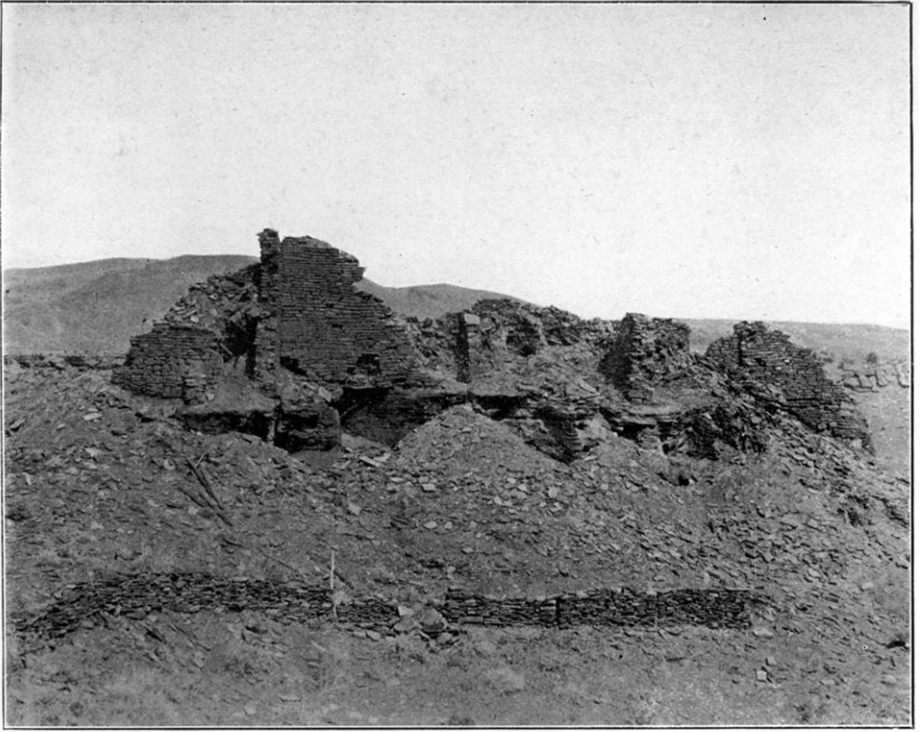
GROUP B, RUIN A

The largest of all the ruins in the Black Falls cluster, and one which bears evidence of having been inhabited for a considerable time, lies about 35 miles northeastward from Flagstaff and about 8 miles from the Little Colorado. This structure is built on a ridge of sandstone extending in a northeast-southwest direction, and consists of two large buildings of moderate elevation. On each side the ridge slopes gradually to a depression, the talus on the east covering a series of rooms, while on the west side, which is more abrupt, no rooms were discovered. The ruin is divided into two sections connected by rows of one-story rooms, the walls of which have fallen. Remains of a great number of roof- and floor-beams are still scattered throughout the débris. These beams are larger than those in any other ruin of the same size known to me (plate XVIII, *a*).

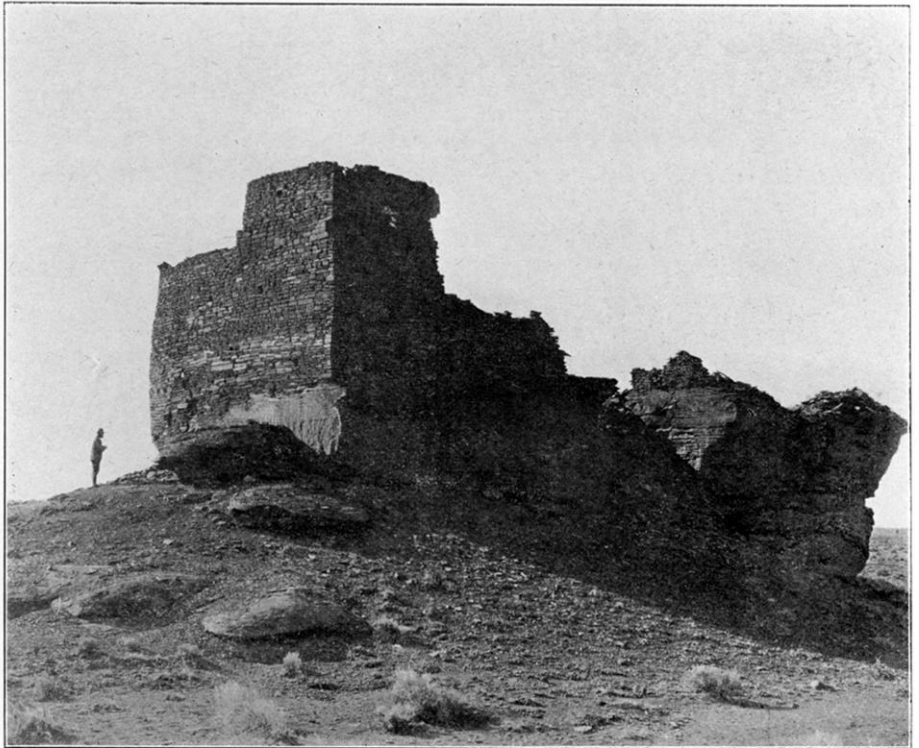
It is difficult to determine the original number of rooms in the first section of this ruin, as the tops of the walls have fallen, filling the chambers with débris. How many basal rooms were buried in the talus of fallen walls at the base of the mesa on the eastern side could not be discovered. Room *a* of this section is elevated on a rocky base about ten feet high. The chamber is small, and its walls have fallen on two sides. The débris has been cleared out of this room by Mr Doney, who found in it the desiccated remains of an infant wrapped in four well-preserved cotton blankets.

Room *b* is a small, narrow chamber, with good walls on three sides, but the fourth wall, which was situated on the edge of the mesa, has fallen over the brink (figure 57).

The ground-floor chamber of room *c* is formed by a gap in the mesa, from which a large cubical block has fallen. The walls of this chamber are the natural rock, to the surface of which adhere fragments of plastering. The beams of the floor of an upper room still rest on the edge of the gap, as in some of the kivas of Walpi today, especially those on the eastern edge of the mesa. The



a — Group *B*, Ruin *A*, Section *a*



b — Group *B*, Ruin *A*

RUINS NEAR BLACK FALLS OF THE LITTLE COLORADO

latter are built in a depression, the solid rock forming the walls on three sides, the fourth wall being of masonry.

Room *d* is buried under débris, and the broken beams which have pressed down on a plastered banquette are still visible. The reeds, straw, and impressed clay, which once formed a floor, may be seen in section.

Room *e* has two stories, and the floor-beams and rafters are still in place, but buried under débris. A high wall extends from

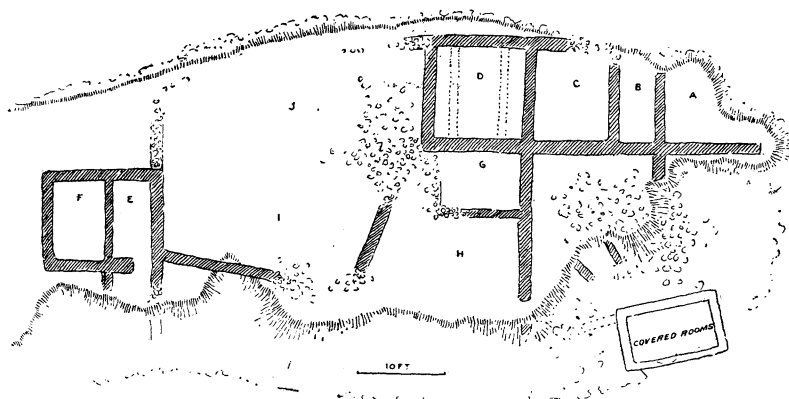


FIG. 57—Plan of group B, ruin A, section *a*.

the eastern wall of room *e*, crossing a depression in the cliff, which is bridged by logs serving as its foundation.

It seems within the bounds of probability that there were thirty rooms in the first section of group B, ruin A, including the basal rooms now deep beneath the fallen walls of the higher portion of the ruin. On the supposition that half of these were uninhabited, and that there were four persons to each room in the remainder, the first section of the ruin would have housed a population of 60. This, however, on the basis of the present population of Walpi as compared with rooms in the ruined pueblo, is a rather low estimate. Considering the population of the second section as about the same as that of the first section, and that of the connecting rooms as about 30, the approximate population

of the pueblos would have been 150. As compared with the size of Walpi the estimated population was 200.

The rooms of the second section, several of which are well preserved, are lower than those of the first section, and the detritus has covered the base so completely that the mesa is inconspicuous. Room *a* is nearly square, and is built on two rectangular rocks, the top of which forms the floor. One of these rocks forms

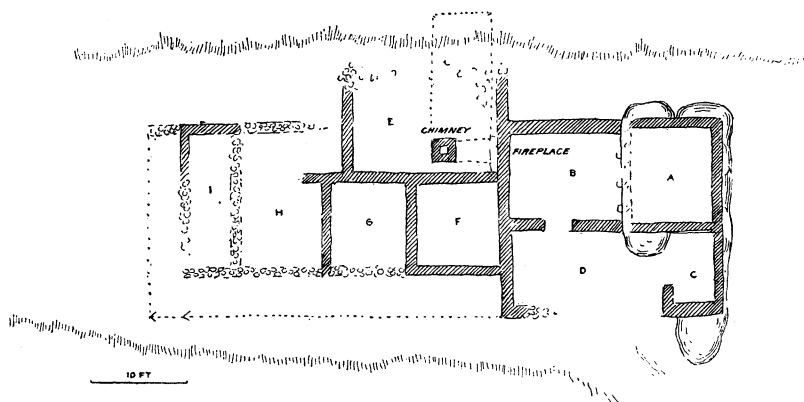


FIG. 58—Plan of group B, ruin A, section *b*.

a side of the lower story of the adjoining room *b*, which is the best preserved of any in this section. The walls of room *b* are well preserved, and the chamber was occupied as a habitation by a herder a few winters ago. The room has a lateral doorway through the wall on one side, and in one corner there is a fireplace communicating with a chimney which will later be described. This room is 12 feet 4 inches by 9 feet 7 inches. In the second section many walls are still standing high above their foundations, indicating many rooms which are now filled with fallen débris in which beams, fragments of pottery, and other objects may be seen. Ten large rooms were counted, several of which had two stories. There were apparently basal rooms on the eastern side. The entire section is about sixty feet long (figure 58).

A chimney-like structure is one of the most conspicuous objects in this part of the ruin. It rises from the mass of débris

covering room *e*, and communicates with the fireplace in room *b*, but a vertical line from its top is 7 feet 10 inches from the nearest wall of the room in which the fireplace is situated. Whether this chimney is aboriginal or not, or whether it is a chimney at all, are open questions. Excepting its state of preservation and fine masonry, no evidence was found that it is of more recent date than the walls of the rooms. If an aboriginal chimney, which I doubt, its structure is unique. It may be a ventilator, comparable with the chimney-like structures described by Mindeleff in the kivas of Cañon de Chelly.

One of the finest reservoirs which I have ever seen in connection with a ruin was discovered near the bottom of the elevation on which ruin A of group B is situated. This reservoir is circular in shape, fifty feet in diameter, and carefully walled. It lies south of the second section of the group, and apparently had a break in the wall in line with the depression east of the ruin. It appears to belong to the same type as those reservoirs on the East Mesa of the Hopi in which snow and rain are collected for future use. There are instructive petroglyphs near group B, ruin A. A number of rock-etchings observed in a small cañon about a mile from ruin A were pecked in a perpendicular wall protected by the overhanging rim of the cañon. These petroglyphs were evidently made by the former inhabitants of this region, as one of the best examples shows the same design as that figured on pottery from the neighboring ruin. There were likewise butterfly, sheep or antelope, and other figures.

It would be quite impossible in this preliminary notice to give a complete account of the archeological objects which Mr Doney has taken from this ruin, but even a preliminary sketch would be incomplete without some reference to them. One of the most instructive objects is the desiccated body of an infant wrapped in coarse cotton cloth, allusion to which has already been made. This bundle was inclosed in three small cotton kilts which were later washed and found to be as "good as new." At the foot of

the infant was a desiccated parrot (?), some of the brilliant plumage of which is still to be seen. This bird has a prayer-stick tied to one leg, which makes reasonable the belief that it was a ceremonial object. Another interesting specimen in the Doney collection is the dried body of a dog which was found in one of the deep clefts in the rock near one of the ruins. This dog has a head similar to that found by the writer in the Chaves Pass ruin in 1896. There are also several fragments of beautiful cotton cloth and netting. Some of the specimens are embroidered, others are painted with circles and other geometric designs. A heavy wooden club, several planting-sticks, and other wooden objects, are to be seen in Mr Doney's collection. There are also many cigarette canes, some with woven handles, as well as seeds of cotton, squash, gourd, and corn, and many objects of shell, as tinklers, ornaments, rings, and bracelets. One of the best *Haliotis* shells which I have ever seen from a ruin was found in one of the graves.

There are also many large turquoise ornaments, some an inch or an inch and a half square. The many metates are made of lava, and are deeply worn as if from long use. The copper bell from a grave near group B, ruin A, is a remarkable specimen. It has the same form as the bells from Arizona ruins which I have elsewhere described, but on one side are ridges indicating eyes, nose, and mouth, apparently made of strips of metal soldered or brazed to the surface. It is not believed that this bell was the product of the former occupants of these now-ruined structures; more probably it was obtained by them through barter.

GROUP B, RUIN B

Across the depression north of ruin A, beyond the reservoir and on top of a mesa, there is a rectangular ruin consisting of two sections connected by low, parallel walls, which inclose a rectangular plaza. It appears that each section was composed of two single-story rooms. No beams nor other evidence of roofing are

now visible, but a considerable quantity of masonry has fallen into the inclosures. From the base of the mesa to the ruin an old trail can be traced by rows of stones on the eastern side, and on the same side there are likewise remnants of rooms. Graves were found among the rocks at the base of the mesa.

GROUP B, RUIN C

About half a mile north of group B, ruin A, there is a fortified mesa, with several rooms, some of which had two stories. The surface of this mesa is flat; the rim is round, the sides perpendicular but of moderate elevation. Most of the walls, which are built on the rim continuously with the mesa sides, have fallen, but sections of the houses, ten feet high, still remain, and the roof-beams and wattling may be seen in place in one or two rooms.

There are some fragments of broken metates made of lava, many potsherds, and a considerable pile of débris at the base of the mesa. Ruin A can be seen from the highest point, and the distant group C, ruin A, is plainly visible. The cemetery is on the eastern side, among the rocks at the base of the mesa.

GROUP C, RUIN A

This ruin, which lies forty miles by road from Flagstaff, and five miles due west of Black falls, is one of the most impressive masses of aboriginal masonry in this section. It is visible for many miles, and from a distance resembles an old castle as it looms from the northern end of an isolated, oblong, red-sandstone mesa rising fifteen feet above the plain. The southern end of the mesa is higher than the northern extremity, and its rim appears to have been surrounded by a low wall, inclosing a plaza. Standing walls cover about half the surface of the mesa. On its eastern side, about midway of its length, there is a gap with perpendicular walls extending about fourteen feet into the side and almost bisecting it.

The following measurements of group C, ruin A, were made by Mr Jack, who has kindly placed them at my disposal:

The longer axis of the mesa bears N. 10° E., this bearing being obtained by using the face of the eastern wall of the highest building. The width of the mesa, at the middle point, measured from the rim of the overhanging cliff, is about 65 feet. The height of the tallest wall of room *a* is 19 feet above its foundation

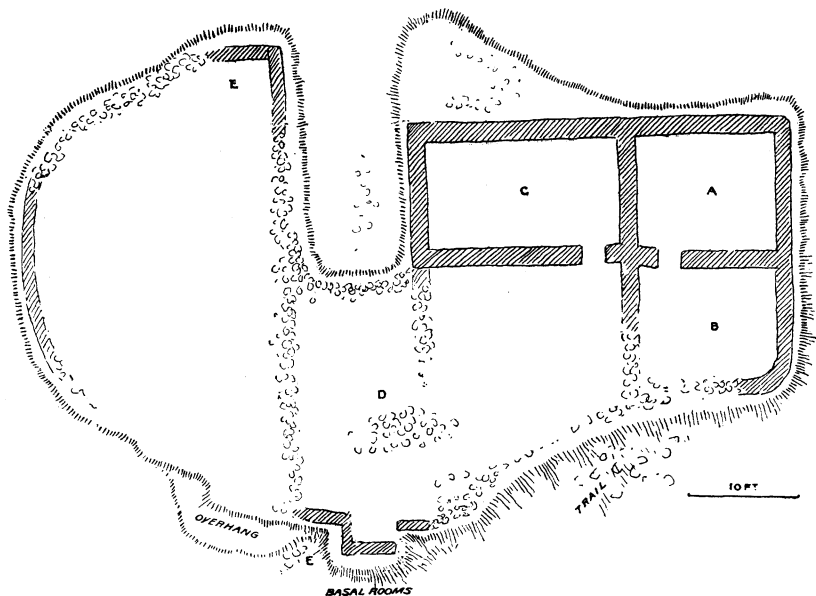


FIG. 59—Plan of group C, ruin A.

on top of the mesa, which is about 10 feet high. The inside measurements of the same room are: Top of mesa to probable position of first floor, 7 feet, 6 inches; first floor to probable position of second floor, 8 feet; bench on which the floor-beams of the second floor rest to the top of the wall, 3 feet.

It may reasonably be concluded that the third story was as high as either of the other two, or about 7 feet 6 inches, which would make the original height of the wall about 23 feet.

The inside horizontal measurements of the northern and southern walls of room *a* are not the same. The former is 11 feet

4 inches, the latter 9 feet 9 inches. The eastern and western walls are 12 feet long. Room *c* is 17 feet 9 inches long, by 9 feet 7 inches wide.

Although the standing walls of this ruin are the best preserved of any of those examined, no wooden beams are found in place, nor are there remnants of the flooring or other débris in the rooms themselves. This absence is explained on the ground that at the time of the abandonment of the settlement, or later, the woodwork was carried away for use in new habitations. Possibly they were taken to ruin *A* of group *B*, or perhaps elsewhere. There is good evidence that this ruin once had large floor-beams, as indicated by openings in the walls in which they once rested.

Examination of the ground-plan (figure 59) shows that the whole surface of the mesa was once covered with rooms, the walls of which still extend to its edge. The highest walls, or those which surrounded room *a*, are of three stories. The two outside walls rise directly from the edge of the perpendicular cliff. There are several small openings at various levels, and holes in which rested the great beams that once supported the flooring are readily seen. At the corners of the rooms the masonry of the second story is bonded to that of the first and third, imparting solidity and strength to the high walls. There is no entrance or passageway between rooms *a* and *c*, but access was had between rooms *a* and *b*. Room *b* is almost perfectly inclosed by standing walls, formerly two stories high. The wall on the northern side has been overturned, and the many stones which have fallen at the base make an entrance at this point possible. As shown by the depressions in the walls, this structure once had two large beams in the roof of the first story, but they have disappeared. Room *c* has one story; its walls are complete on all sides, with an interior entrance into *d* and an exterior passageway. Rooms *a*, *b*, *c*, are conspicuous from a distance and join the greater part of the ruin. At intervals on the rim of the mesa other walls are found, some sections of which are four or five feet high,

but it is difficult to trace the walls of the rooms designated *d* and *e*.

This ruin also has cave rooms at the southern base of the mesa, which recall those of the other ruins in the Black Falls cluster. Plate XVIII, *b*, shows ruin A, group C, looking southward, and gives the general appearance as one approaches it from the west. The tall, square tower on the right incloses room *a*, and the lower wall extending to the gap is the side of room *c*. The fragments of masonry on the left of the gap are all that remain of the walls of room *e*. The mounds on the mesa to the left of the last are remnants of an encircling wall and of rooms which once surrounded the open space on the end of the mesa. The trail to the top of the mesa passes over the fallen walls of this room, as shown in the illustration.

The wall on the edge of the mesa, just above the large boulder in the foreground of this plate, is a part of room *d*, and at the bottom of the cliff, at this point, can be seen the walls of the basal rooms built at right angles to the cliffs. The level part of the mesa summit is broken by a single fragment of elevated wall—a part of room *e*. On this side of the mesa the upper part overhangs the lower, forming a cave, but no indication of rooms was detected here.

MORTUARY OBJECTS FROM GROUP C, RUIN A

The cemetery is about a hundred yards east of the ruin, and is small in extent. The mortuary objects found in a single grave opened at ruin A, group C, will give an idea of the burial deposits. The graves are oval, and consist of cysts made of slabs of stone set on end and covered with other flat stones. The upright stones were cemented together with adobe, the covering slabs being apparently luted to the edges of the uprights. These burial cysts were commodious, and in the one uncovered, the body, which was that of a woman, lay on one side, at full length, with the head at the wider end. To the right of the hips were

found a decorated food-bowl in which was a smaller bowl, a large and beautifully decorated vase, and a second small food-bowl. On the left arm was an armlet made of a *Pectunculus* shell identical with those found in the ruins of Homolobi. There was a remnant of a wooden prayer-stick, painted green, on the breast. Near the mastoid processes were square ear-pendants made of lignite covered with a turquoise mosaic surrounding a central red stone. These are beautiful specimens of turquoise mosaic, far superior to those now in use in the Hopi pueblos. The skeleton was in a very poor state of preservation, probably due to the character of the soil, which consists of cinder sand through which water readily percolates. There is a general similarity in the texture and decoration of the four pieces of pottery found in this grave. They belong to the black-and-white variety and have geometric ornamentation.

GROUP C, RUIN B

About two miles from the large ruin just described, to the left of the road to Schültze's spring, is a small, red-sandstone ruin standing on an isolated bluff. This ruin covers the top of the mesa and is conspicuous for some distance. The rim of the mesa overhangs in places, as the lower strata are much eroded, and the ruin can be entered at only one point. All the rooms of this ruin are single-storied, and most of the walls are high, although there is a considerable quantity of fallen stone in the rooms and at the base of the mesa (figure 60).

Room *a* is a semicircular inclosure, most of the walls of which have fallen. This is perched over a projecting table or platform, the rim of which the wall covers. The ground-plan of room *b* is nearly square, with well-preserved walls which rise directly from the edge of the mesa, which is steep on three sides. The interval between rooms *b* and *d* is strewn with stones, but traces of low walls can be seen. One of these walls is on the edge of the steep mesa; the other, parallel with it, almost

divides the space in halves. This is the part of the ruin which one first enters after climbing up the talus of fallen rocks. Room *d* is large, with well-preserved walls four or five feet high, and with a projecting platform on one side on which only obscure indications of artificial structures may be detected.

Room *f* is rather small, with walls built over a projecting platform, and resembling, from below, a bow window. Room *e* is

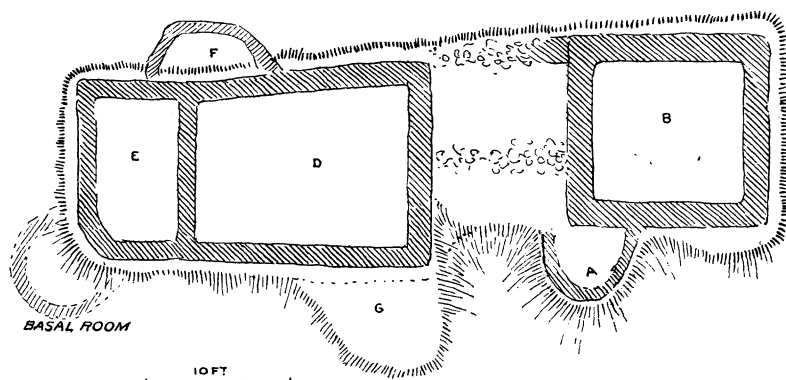


FIG. 60—Plan of group C, ruin B.

well constructed; it contains considerable débris, and its sides are continuous with the perpendicular wall of the mesa. At the base of the cliff, just below room *e*, there is a low, almost circular wall, forming an inclosure somewhat similar to the basal rooms of some of the ruins already described. Although in general its architecture does not differ from many other rectangular ruins previously discussed, the overhanging platforms give a unique appearance to the structure. About 300 feet eastward were noted the edges of flat stones which indicate burial cysts. The whole length of this ruin is 46 feet, and the width, including the projections at *f* and *g*, 21 feet. The sizes of different rooms measured were:

Room <i>b</i> ,	10 feet 8 inches,	by	9 feet 10 inches.
" <i>d</i> ,	15 " 4 "	"	10 " 5 "
" <i>e</i> ,	10 " "	"	5 " 10 "

The following bearings were taken from this ruin :

Group C, ruin A, bears N. 12° E.
Mt Agassiz “ S. 48° W.
Schültze's spring “ S. 50° W.

CONCLUSIONS

The preceding description will give a general idea of the ruins in this section. It is not possible to compare them with the ruins of Homolobi, where most of the walls have disappeared or have so fallen as to render the original plan unrecognizable. The difference in building material employed in the construction of the pueblos on Cheylon fork of Little Colorado river must have imparted a somewhat different character to the buildings erected there, but there is some likeness between the ruins at Chaves pass and the lava ruins near Black falls. In this connection it may be stated that there is also a large ruin near Homolobi built of lava blocks on a lava mesa.

The racial and clan kinship of the former inhabitants of these pueblos is somewhat problematical, but it is quite likely that the people were akin to the Hopi. This is shown not only by the character of the houses, but also by the pottery and various other objects found near them. Both legendary and archeological evidences point to the conclusion that the people who once inhabited the pueblos near Black falls came from the north, and were related to those who once lived in cliff-houses and other habitations on the Rio Colorado and its tributary, the San Juan. Hopi legends say that the Snake clans formerly lived at Tokonabi, on the Rio Colorado, and that they migrated southward and built a pueblo about fifty miles west of the present Hopi towns, which they called Wukoki. This pueblo, it is said, still has high standing walls. The direction and distance of the Black Falls ruins from Walpi correspond pretty closely with the legend, and while it may not be possible to identify any single ruin of this cluster as Wukoki, the traditional Wukoki of Hopi legend is not far from that point. The tradition that these people came from the north

is supported by the close resemblance between the character and the decoration of their pottery and that of the San Juan ruins.

It might naturally be supposed that there would be a close likeness between the pottery of the Black Falls ruins and that of Homolobi, and that kinship once existed between the inhabitants of these two pueblos on the same river. Close study, however, shows marked difference, and I am led to the belief that while both were Pueblo people and therefore similar in culture, the clans which inhabited Homolobi were not the same as those which lived at the Black Falls villages. The clans which lived at Homolobi came from the far south, through Chaves pass, while those at Wukoki came from the opposite direction. Both eventually sought refuge in the Hopi pueblos, where their descendants now live together. The clans from Homolobi were the *Patki*, *Tuwa* (*Kükütc*), and *Tabo* (*Piba*), whose route to the Hopi towns was by a trail which goes directly north past the "Giant's chair." The clans from Wukoki were the *Tcūa*, *Patuñ*, and others who migrated almost eastward when they sought their home in Tusayan.

The traditions of these clans will be compared at length in a final report. The preceding pages give only a summary of many notes, and but few of many photographs obtained during a comparatively brief visit to these remarkably well-preserved ruins.